identiFINDER NGH

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User Manual

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Table of Contents

1 Introduction ... 7

2 Start of the Instrument ... 12

3 User Modes ... 15

4 The DOSE Rate Mode ... 16

5 The FINDER Mode ... 18

6 The Nuclide Identification (IDENT) Mode ... 20

6.1 Procedure to identify a source ... 20

7 Expert User Modes... 25

7.1 Overview of All Settings ... 26

7.2 Gamma/N Counting ... 27

7.3 Finder Options ... 28

7.4 Dose rate Settings ... 29

7.5 Alarm Options ... 31

7.6 Show Spectrum ... 35

7.7 Identify Options ... 41

7.8 Presets Setup ... 46

7.9 Do Calibration ... 47

7.10 Setup Disp./Time ... 51

7.11 Maintenance Menu ... 53

7.12 Stabilization ... 61

7.13 Calibration Source ... 61

7.14 Data Logging ... 62

8 Connecting the identiFINDER to the PC ... 63

8.1 Serial Connection without interface box ... 63

8.2 Serial Connection with the interface box ... 63

8.3 USB Connection 65
8.4 Starting the winTMCA32 or identiFINDER Transfer Software 66

9 Basics of the winTMCA32 Software 68
9.1 Load Actual Spectrum ... .68
9.2 Load All Spectra ... .69
9.3 Nuclide Selection.....69
9.4 Send Spectrum to Device 70
9.5 Nuclide Identification ... .70

10 Basics of the Transfer Software ... .72

11 Maintenance ... .74
11.1 Battery Indication ... .74
11.2 Charging the powerPACK plus ... .74
11.3 Replacing the powerPACK plus battery pack ... .77
11.4 Replacing the powerPACK or inserting standard batteries .. 78

12 Trouble Shooting 80
12.1 Cannot switch on the device ... .80
12.2 Failing initial calibration ... .80
12.3 Apparently wrong dose rate indication ... .80
12.4 Apparently wrong nuclide identification ... .81
12.5 Nuclide identification not possible or „Not in Library“ ... .81
12.6 Neutron Alarm but no source present ... .81
12.7 No sound in case of alarm ... .82
12.8 No vibration in case of alarm 82
12.9 No LED indication in case of alarm 82
12.10 FINDER Mode does not show anything ... .83
12.11 Device switches off automatically ... .83
12.12 Password is set but unknown 83

12.13 No Spectrum Transfer to PC ... 83

13 Specifications ... 85

14 Quick Reference Guide ... 92

14.1 At a Glance ... 92

14.2 Switching ON the identiFINDER ... 93

14.3 Searching for a Radiation Source ... 94

14.4 Source Characterization / Nuclide Identification ... 95

1 Introduction

The identiFINDER NHG is a digital hand held gamma spectrometer designed for in situ operation with special features of

Searching for single radioactive gamma sources or for areas of contamination with gamma radio nuclides,

Automatic identification of radio nuclides based on measured gamma ray spectra,

Gamma dose and dose rate measurement,

Indication of the presence of neutrons in the radiation field by presenting neutron count rate and accumulated neutron counts.

It carries out qualitative and quantitative analysis of gamma radiation using a 1.4 2 NaI(Tl) (other customized detectors may be available for special applications, e.g. for EOD) and an internal Geiger Mueller (GM) tube. An on-board DSP (Digital Signal Processor) with sophisticated software and an internal data base enables the identiFINDER to carry out the above mentioned functions. The neutron indication is based on a moderated ^{3}He tube.

Small size and low weight as well as the three-button menu-driven operation combined with a reliable self-calibration make the identiFINDER convenient to use for anyone. The initial calibration and, furthermore, the permanent and continuous stabilization running in the background in parallel to any performed measurement, are based on an internal Cs-137 stabilization source.

Digital signal analysis replaces the "old fashioned" analogous signal shaping.

The standard delivery of an identiFINDER instrument consists of the following components (Figure 1 or Figure 2):

Aluminum or plastic carrying case with

Hand held spectrometer identiFINDER,

neutron moderator box (optional),

box with Potassium for enhanced K-40 background (optional),

powerPACK plus (includes rechargeable batteries),

powerPACK (for the use of standard AA-size batteries (not included)),

external battery charger (optional),

identiFINDER system cable for connecting to a PC using the USB or RS232 interface and for recharging the batteries,

external power supply with mains adaptors,

external earphones for silent alarms (optional, requires Hardware modifications),

source kit (only for EOD applications),

holster with belt attachment tool and strap,

winTMCA32 and identiFINDER transfer software CD-ROM,

User" s manual.

Figure 1
Scope of supply, including①-power supply, ②-powerPACK, ③-accessories (optional), ④-software CD, ⑤-miniUSB cables, ⑥-interface box, ⑦-identiFINDER in holster, ⑧-source kit (optional), ⑨-miniUSB to serial cable

Figure 2
Scope of supply, including 1*-neutron moderator (optional),* ***2****- interface box,* ***3****- miniUSB to serial cable,* ***4****-earphones (optional),* ***5****-miniUSB cable,* ***6****- miniUSB to miniUSB cable,* ***7****-battery packs (powerPACK and powerPACK plus),* ***8****-Potassium (K-40) box (optional),* ***9****-identiFINDER in holster,* ***10****-european mains adaptor (optional),* ***11****-UK mains adaptor (optional),* ***12****-wrist strap,* ***13****-mains power supply,* ***14****-external battery charger (optional)*

Figure 3
Overall view of the identiFINDER (front view) with ①-battery compartment lock, ②-ON/OFF button, ③-blue LED (neutron alarm, optional), ④-selection buttons, ⑤- command line, ⑥-red LED (gamma alarm), ⑦- internal GM tube, ⑧-internal He-3 tube (neutron detection, optional), ⑨-internal NaI(Tl) scintillation detector

The bottom part of the display shows a black shadowed command line with up to three commands which can be executed using one of the buttons "L", "M" or "R" for left, middle and right keys, respectively.

Before switching on the identiFINDER you should

Remove it from all dirt,

Check it for visible damage,

Check whether powerPACK plus is inserted before connecting the battery charger: Open the screw "battery pack lock" and shift off the handle.

As an alternative one can use the additional powerPACK with 4 standard AA-size batteries.

Please make sure to read Chapter 11 ("Maintenance") on how to open the device and handling the powerPACK or powerPACK plus.

The powerPACK plus is not charged on reception of the instrument. The powerPACK plus has to be inserted into the identiFINDER and the device has to be connected to power supply before operation.

It must be charged for at least 12 h before switching the device on!

The powerPACK instead can NOT be used to charge any batteries inside the device, even rechargeable batteries will not be charged! This feature prevents overheating or even explosion of non-rechargeable batteries. Make sure to charge rechargeable batteries outside the identiFINDER with an external charging unit.

The device cannot be used without batteries and just connected to the mains supply. This will cause wrong dose rate values and Identification results. Please make sure to have a battery pack inserted at any times.

2 Start of the Instrument

After charging the powerPACK plus for at least 12 hours (see Chapter 1 and 11.2), the device can be operated. To switch on the instrument press the ON/OFF button until the red and blue alarm LEDs illuminate.
Soon the display will show the initialization screen (Figure 4):

Figure 4
identiFINDER startup screen

After start-up (Figure 5) the energy calibration of the identiFINDER starts (Figure 6). Within about 20 seconds the high voltage and the fine gain will be adjusted according to the measured gamma ray spectrum of the calibration source (i.e. Cs-137). A successful calibration ends with a message and the display of fine gain and HV values. If the calibration cannot be finished correctly an error message shows up. The device may in this case not function correctly, which is indicated by an "N" in the upper right hand corner. A "S" instead indicates a functioning calibration. Please refer to Chapter 7.9 and 12 for troubleshooting tips.

Maintenance of the energy calibration is necessary also during operation since temperature or count rate changes introduce a shift in the detection devices. The identiFINDER needs to be stabilized with the aid of the internal Cs-137 source. The background energy stabilization will be done automatically in normal operation, indicated by the letter "S" in the upper right hand corner. Presence of strong sources may disturb the stabilization and calibration of the identiFINDER. The device will then switch off the stabilization and display an "N" in the upper right hand corner in order to warn the user that the stabilization is currently not available. A precise energy calibration though is essential for the identification of any nuclides found in the field.

Figure 5
The identiFINDER display during initialization

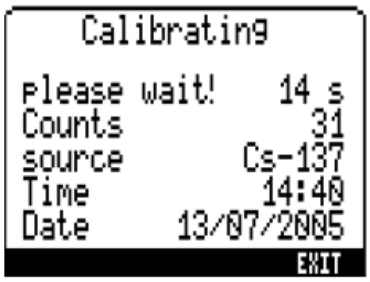

Figure 6
The identiFINDER display during the calibration

The letter in the right hand corner shows the status of the calibration and stabilization:

"S" indicates a working stabilization, i.e. everything is working fine,

"N" stands for a failed initial calibration or the stabilization is contemporarily switched off (the external radiation field is too strong to stabilize on the weak calibration sources), please switch the device off and back on or use the "Do Calibration" menu (see Chapter 7.9).

The identiFINDER is now ready for operation and enters automatically the DOSE rate mode (Figure 7).

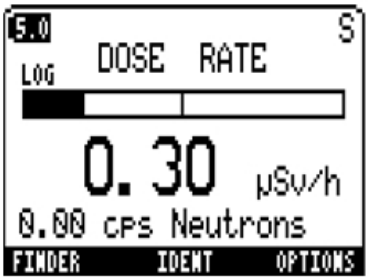

Figure 7
DOSE rate screen

The DOSE rate screen is the basic screen of the identiFINDER. All other functions can be accessed from this screen by means of the "L", "M", and "R" buttons.

To switch off the identiFINDER press the ON/OFF button until a tone sounds - simultaneously the display will show "POWER OFF"

3 User Modes

The identiFINDER is usually operated in the so called *EASY USER MODES*. This is the default mode after switching on the device.

The *EASY USER MODES* allow to access different user screens (measuring modes) which provide for

- Gamma dose and gamma dose rate measurements (DOSE rate mode),
- Search for single radioactive gamma sources or for areas of contamination with gamma radio nuclides (FINDER mode),
- Automatic identification of radio nuclides based on measured gamma ray spectra (IDENTification mode),
- Indication of neutron radiation, gamma dose / dose rate alarms or optional neutron alarms (DOSE, FINDER and IDENT modes).

The *EASY USER MODES* are the standard modes for non-expert users. They provide sufficient information to observe the local radiation level, to detect any increase of the radiation level due to radioactive sources or contaminations, to localize and to classify these sources. Any increase of the local gamma or neutron radiation field which may be harmful to health or giving hints on terrorist activities is indicated immediately by the corresponding alarms (acoustic, visible, and vibration alarm signals).

To obtain very detailed information in case of emergency or to change parameters and settings of the identiFINDER the device must be switched to the *EXPERT USER MODES*. This is done by pressing the right button („OPTIONS“) in the DOSE or the FINDER screen. However, the *EXPERT USER MODES* can be protected by a password if required.

The *EXPERT USER MODES* allow accessing various menu screens. Many parameters like alarm thresholds, times for identification, units (e.g. Sievert and rem) and the language of the user interface can be changed. The *EXPERT USER MODES* also provide for a spectrum display. A detailed description of these features is not addressed here but is given in the corresponding Chapter 7.

4 The DOSE Rate Mode

The DOSE rate mode is the starting point for all other identiFINDER features. Figure 8 shows the DOSE screen which automatically appears when the startup procedure is finished successfully.

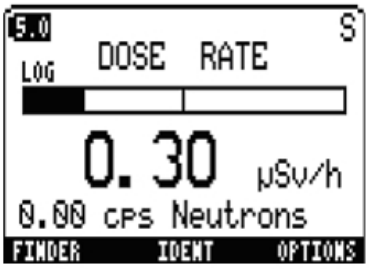

Figure 8
identiFINDER screen for the DOSE rate mode

On the DOSE screen the gamma dose rate - or more precisely the ambient dose rate equivalent H*(10) - is numerically and graphically displayed.

The length of the horizontal black bar represents the actual dose rate reading in a logarithmic scale. The limits are 0.01 µSv/h up to 1 Sv/h (or 1 mrem/h up to 100 rem/h, depending on the choice of units). The small vertical separator (here above the number ″30″) displays the dose alarm value.

Additionally the count rate for neutrons in counts per seconds (cps) is given in this display.

The letters “S” or “N” in the upper right hand corner indicate a working (“S”) or not working (“N”) stabilization.

By pressing the left (“FINDER”) or middle (“IDENT”) button the identiFINDER is switched to the FINDER or the IDENTification mode. Choose the right key (“OPTIONS”) if you intend to enter the *EXPERT USER MODES*.

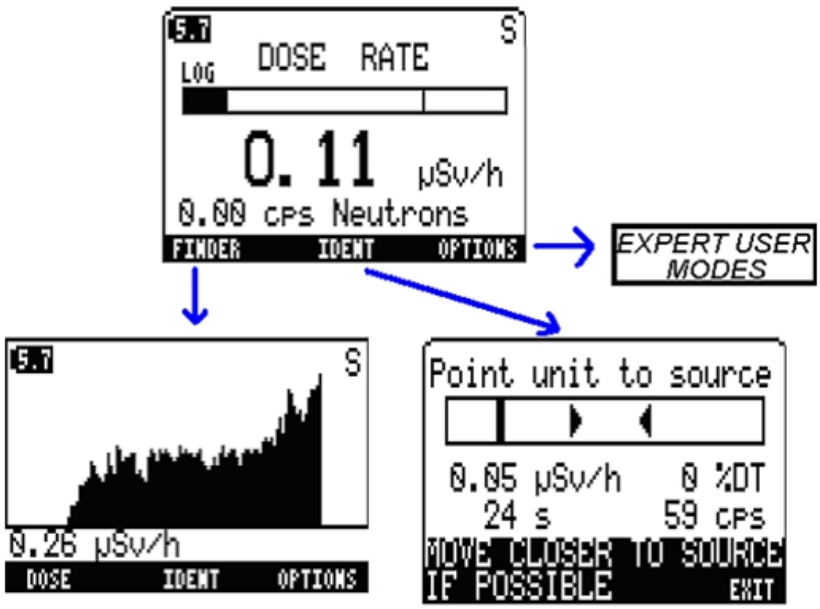

Figure 9
Menu overview of the EASY USER MODES

If the detected radioactivity exceeds the alarm levels, a warning message will be shown on the top line of the display.

On very high dose rates (above 500 µSv/h), the scintillation detector will be switched off and the GM tube is responsible for the dose rate display.

5 The FINDER Mode

The FINDER mode can be used to localize the radiation source if an increase of the dose rate level is detected. Follow the identiFINDER display and the acoustic signals to easily locate the source or contamination.

From the DOSE rate mode the FINDER mode can be entered by pressing the left button. The identiFINDER will now switch to the FINDER screen shown in Figure 10.

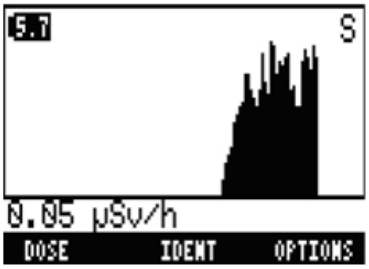

Figure 10
Searching for a hidden source using the FINDER mode (1)

The initial screen is empty and starts being filled from right to left by a histogram representing the actual dose rate reading shown in the bottom line.

In general: The higher the bar the closer the source.

A typical course of a search for a hidden source is shown in the three figures (Figure 10 to Figure 12).

When starting the search (Figure 10) the identiFINDER is far away from the source and is moved gradually towards it (Figure 11). The actual dose rate reading is 0.26 Sv/h which is indicated by the vertical bar most right. Afterwards the identiFINDER is shifted away (Figure 12), the source is located.

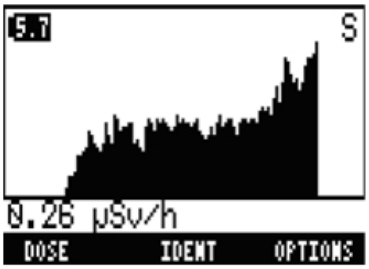

Figure 11
Searching for a hidden source using the FINDER mode (2)

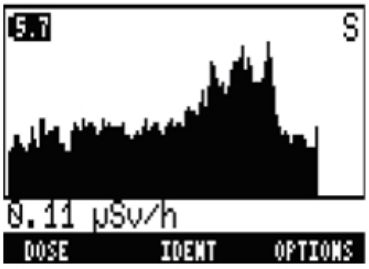

Figure 12
Searching for a hidden source using the FINDER mode (3)

The default time scale of the FINDER mode (i.e. the number of data entries per second) can be changed by the expert user (*EXPERT USER MODES*).

From the FINDER mode the automatic identification process can be started by pressing the middle key ("IDENT") in case that a source or area of contamination was found. With the left button ("DOSE") one can go back to the DOSE rate mode. With the right button ("OPTIONS") the *EXPERT USER MODES* can be entered.

6 The Nuclide Identification (IDENT) Mode

Pressing the middle key (“IDENT”) from DOSE rate mode or FINDER mode will turn the instrument into the nuclide IDENTification mode. The display shown in Figure 13 will appear.

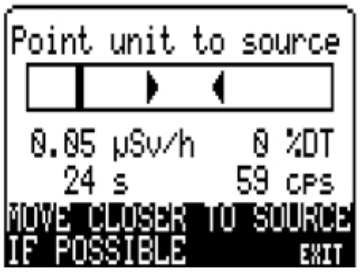

Figure 13
Starting screen for the IDENT mode

6.1 Procedure to identify a source

In the IDENT mode the instrument is acquiring the gamma ray spectrum of the unknown source or contamination. The operator must point the instrument to the source of radiation, which can be determined using the FINDER mode.

The device needs to acquire sufficient information from the gamma source, i.e. good count rates. Optimum results will be obtained if the count rate is in the range indicated by the two arrows (▸ and ◂). Depending on the special application, a lower level (arrow pointing right) may not be available. If the count rate is too small a message “MOVE CLOSER TO SOURCE IF POSSIBLE” (Figure 13) will appear. In case that the count rate is too high the message “MOVE AWAY FROM SOURCE” will be shown. In the advised count rate range, the identification algorithm will give the best results. The data collection can be aborted by pressing the right button (“EXIT”).

During the spectrum accumulation the actual dose rate (in Figure 13: 0.05 Sv/h), the actual count rate (59 cps), and the dead time (0 %) are shown together with the remaining acquisition time (24 s).

If the spectrum acquired has not reached sufficient statistics, the instrument shows a message (Figure 14). In this case either the acquisition time was too short or the radiation level was too low, and the identification algorithm is not started.

Figure 14
Acquisition has not reached enough statistics to identify the radioactive source

The user has to choose one of two options: With "YES" the identiFINDER resumes data acquisition. The data is added to the data already acquired in the previous identification run. "NO" causes a message "Nuclide listing: Counts too low", and after quitting this message with "EXIT" the identiFINDER returns to the DOSE rate or FINDER mode.

If the measurement was successful and the spectrum contains sufficient counts for a nuclide analysis, the instrument processes the spectrum. The results are displayed as a nuclide listing (Figure 15).

Figure 15
Result of a nuclide analysis of a spectrum measured in IDENT mode

The data given in the nuclide listing (Figure 15) are interpreted as follows:

The spectrum analysis suggests that the analyzed source contains ^{60}Co, and maybe ^{22}Na.

The supposition is rated between 1 (unlikely) and 10 (very likely). A very weak indication (confidence rating 1 to 3) is displayed as "-". In the example shown the ^{60}Co is very likely to be present - indicated by the 9; there may be an admixture of ^{22}Na.

The nuclides found are classified according to their basic field of application:

Medical nuclides (MED) are mainly used for medical diagnostics and/or therapy,

Industrial nuclides (IND) are applied in the industry, and

Nuclides marked as NUC originate from or occur as by-product in the production process of fissile material for nuclear power plants and for nuclear weapons.

NORM indicates Naturally Occurring Radioactive Materials. Corresponding nuclides may be present in various materials like fertilizers, ceramics, welding rods etc. and in the natural environment.

OSI library contains all isotopes that may be present at On Site Inspections of Nuclear Test Fields.

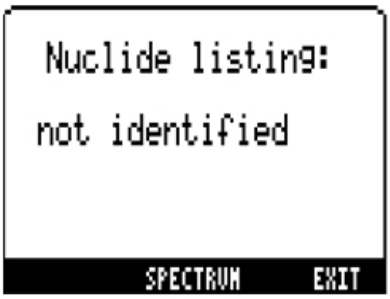

Figure 16
Results of identification: Not identified

If the message Nuclide listing: Not identified! (Figure 16) appears the identiFINDER acquired sufficient data and executed the identification algorithm, but did not find a matching spectrum in the library selected.

During the data acquisition either a dose rate warning (optional feature; tone sequence) or a dose rate alarm (permanent tone) indicates that the dose rate exceeds the corresponding thresholds, but no message is displayed.

After a (successful or non-successful) identification the operator can choose one of the following actions by pressing the corresponding button:

SAVE/SPECTRUM:
The measured spectrum will be stored (non-experts; if password is chosen but has not been entered) or can be viewed (expert users, only; if either no password has been chosen or the correct password has been entered) depending on the access rights of the user. Stored spectra can be transferred to a PC for a more detailed offline analysis.

Altogether 100 spectra can be stored (numbers 0, 1, 2, … 99). If the spectrum memory is full and you try to store a spectrum, the instrument displays the message

"No empty slot found - do you want to overwr. old spec.?"

Accepting this by pressing "OVERWRITE" opens an entry field, and by using the "SKIP" command the operator can select the spectrum to be overwritten.

EXIT:
The instrument returns to the menu selected previously.

If the detected radiation exceeds the alarm levels during the acquisition time, the vibrator as well as the beeper will not be switched on. The red LED will (even if the LED is switched off) indicate a dose rate alarm with flashing, a dose alarm with permanent illumination. The blue LED will accordingly show the neutron detection.

The main reasons for failures in identifying unknown sources are:

The source to be characterized is an irresolvable mixture of several nuclides.

The source is heavily shielded.

The stabilization may temporarily be switched off, go back to the DOSE screen and check the letter in the upper right hand corner. If

the device indicates “N”, try a recalibration (please refer to Chapter 12 for troubleshooting tips).

CONTINUE (optional, can be added by factory on request):
The instrument will prolong the data acquisition for another period and may hence improve identification for weak sources.

7 Expert User Modes

These advanced modes allow access to a multitude of device parameters and options of the identiFINDER. However, this requires expertise in the field of nuclear spectroscopy and nuclear instrumentation; therefore these settings can be protected by a password. The password is a sequence of seven letters ("L", "M"and "R") (see Chapter 7.11). If the advanced user has entered the optional password once, the access to the *EXPERT USER MODES* will be permitted until the device is switched off.

Selecting the function "OPTIONS" (right key) from the DOSE rate or FINDER mode will open the password window and after a successful identification as an expert user, the options menu (Figure 17) appears.

One out of five different items can be marked (move the highlighted field "DOWN" with the left key). Use the left key to "SELECT" the item afterwards.

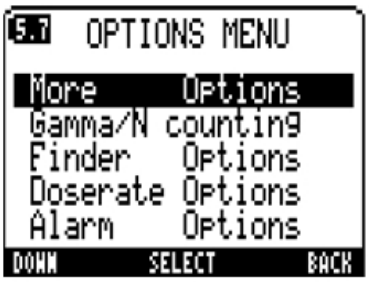

Figure 17
Options menu

7.1 Overview of All Settings

	Menu Level						Parameter	Remarks
	1	2	3	4	5	6		
EASY MODES	**DOSE RATE**							Dose Rate display
	FINDER							Source Finder mode
	IDENT							Nuclide Identification
XPERT USER MODES	**OPTIONS**							Expert User Modes
		More Options						
			Show Spectrum					Spectrum display
			Identify Options					
				Identify Settings			Time [s]	Measuring time
							No. of Nuc	Nuclides to be identified
							Library	Nuclide library
				Edit Isotope List				Libraries entries can be changed
			Presets Setup				Real [s]	Real time preset
							Live [s]	Live time preset
			Do Calibration					Maintenance: re-calibration
			Advanced Options					
				Setup Disp./Time				
					Display Settings		Language	Language selection
							BkLight [s]	Time preset for display illumination
							Contrast	Display contrast correction
							A.Off[min]	Time preset for Auto-OFF
					Date / Time		Date	Current date
							Time	Current time
				Maintenance				
					Change Password			
						Set Password	Password	Password for Expert User Modes
						Clear Password		No password protection
					Show Status			Service information
					Factory Defaults			Reset all settings to factory defaults
					Erase all Spectra			Delete all stored Spectra
					Factory Test			Hardware Test (service function)
				Stabilization				
					Source Stab.Status			Service information
					PSA Stab.Status			Service information
				Calibration Source			Cs-137	Source selection for re-calibration
							K-40	Not allowed for identiFINDER NHG
				Data Logging			Timer [s]	Defines the interval for storage
							Status	The data logger can be on or off
		Gamma/N Counting						Counting display
		Finder Options					Time [0.1s]	Speed of FINDER functions
							Sensit.[%]	Indication of radiation above backgr.
		Doserate Options					IntTime [s]	Aver. time for actual dose rate value
							Unit	Dose rate unit

Alarm Options			
	Alarm Indications	Sound	Acoustic alarm indication
		Vibrate	Silent alarm indication
		Light	Visual alarm indication
	Dose alarm Lv	Dose alarm	Dose alarm setting
		Dose warning	Dose warning setting
	Doserate Alarm Lv	Dose rate alarm	Dose rate alarm setting
		Dose rate warn.	Dose rate warning setting
	Neutron Alarm Lv	N cpm	Neutron count rate alarm setting

Table 1
Overview of the EXPERT USER MODES menu

7.2 Gamma/N Counting

In the Gamma/N Display (Figure 18) three values are displayed:

N-rate:
The actual neutron count rate value is given in counts per second (cps).

N-counts:
The accumulated neutron counts are displayed. This value (together with G-counts and T-count) can be stopped ("STOP CNT") and reset ("RESET CNT") using the middle button. The corresponding time frame is given by T-count.

G-counts:
The accumulated gamma counts are displayed. This value (together with N-counts and T-count) can be stopped ("STOP CNT") and reset ("RESET CNT") using the middle button. The corresponding time frame is given by T-count.

T-count:
The time expired since the start of the N-counts and G-counts is available here. It is given in seconds and can be stopped ("STOP CNT") and reset ("RESET CNT") together with N-counts and G-counts using the middle button.

G-dose:
The accumulated gamma dose is displayed. It is given in the selected unit (i.e. Sv or rem). This value (together with T-dose) can be reset ("RES. DOSE") using the left button. The corresponding time frame is given by T-dose.

T-dose:
The time expired since the start of G-dose is available here. This value is given in seconds and can be reset ("RES. DOSE") together with the G-dose using the left button.

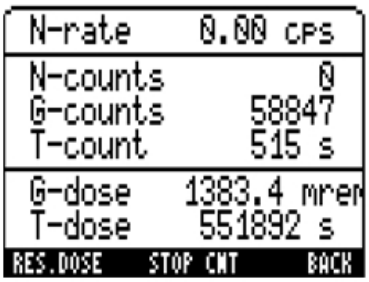

Figure 18
Gamma/GM display

7.3 Finder Options

Opening the Finder Options from the OPTIONS Menu will provide the opportunity to change two parameters (Figure 19):

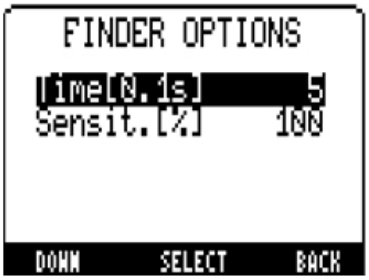

Figure 19
Options for FINDER settings

To change either the finder detection speed ("Time[0.1s]") or the detection sensitivity ("Sensit[%]") move the inverted field "DOWN" with the right button and press "SELECT" to make changes.

Time[0.1s]

This parameter defines the speed of the FINDER mode detection. The larger the time, the slower the reaction time, but this means the device is more sensitive to find smaller sources.

If the value 2 has been chosen, every 0.2 s one value will be added to the FINDER mode display representing the average dose rate during this last period.

Sensit[%]

This parameter defines the dose rate level Ds above which the identiFINDER emits an audible signal together with every new vertical bar appearing. The identiFINDER measures the ambient dose rate equivalent and determines the average background dose rate <BDR> and its variation = sqrt(<BDR>).

It is Ds = <BDR> + 3.5 * * 100/Sensit.

The frequency of the finder tone follows the dose rate. The FINDER mode display rescales automatically according to the highest value measured.

If either the threshold for dose rate alarm or dose rate warning is exceeded, an appropriate message ("RATE WARNING", "RATE ALARM") is faded into the top line of the FINDER mode display.

7.4 Dose rate Settings

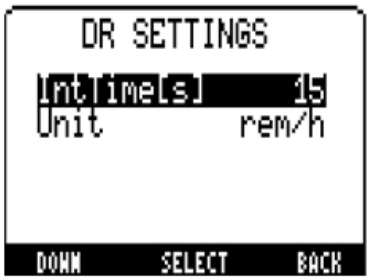

Figure 20
Options selectable in "DR Settings" menu

Mark either the selection of the integration time ("IntTime[s]") or the dose rate unit ("Unit") by moving the inverted field ("DOWN") and press "SELECT" to make changes.

IntTime[s]

In the DOSE rate mode the dose rate reading is actualized every second. The shown value is the average dose rate during the last "IntTime[s]" seconds. Values between 1 and 30 can be selected by pressing "+" or "-" followed by "ACCEPT". The default setting is 15 s. The larger the integration time, the less the dose rate reading fluctuates. The averaging process is suppressed when large dose rate changes are detected.

Unit

Possible settings for the dose rate unit are Sv/h or rem/h; additionally the unit Bq can be selected which is true only for a defined geometry (i.e. 1 meter distance to the source). All units - including the limits for dose and dose rate alarm - will be converted according to the rule 1 Sv = 100 rem.

Especially for medical applications (e.g. Iodine-131 treatment) the unit "Bq" for an activity determination is available. Using this setting the display in the DOSE rate mode will change to the following (Figure 21):

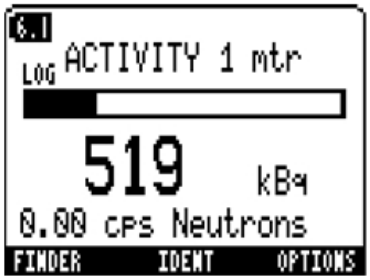

Figure 21
Activity mode for Iodine measurements

The display shows the calculated Iodine activity if the identiFINDER is placed in 1 meter distance from the patient.

The usage of the unit Bq is advisable only after prior consultation of the manufactory including special calibration and training of the operator.

7.5 Alarm Options

Selecting the Alarm Options the following display (Figure 22 or similar) will appear:

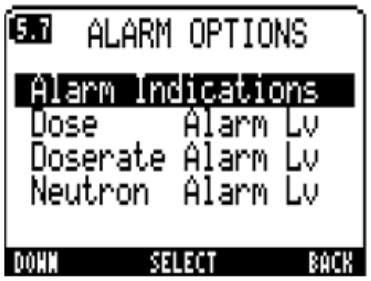

Figure 22
Display after selecting "Alarm Options"

Alarm Indications

This type of identiFINDER instrument has three alarm indications (Figure 23):

Sound (acoustic alarm)

Vibrate (silent alarm)

Light (red LED for visual alarm).

If the alarm sound is switched off, also the button click tone will not be available.

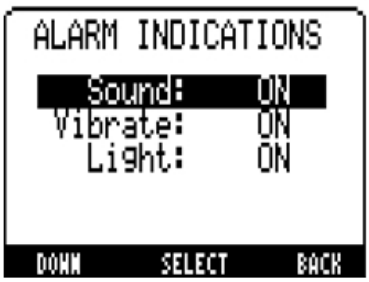

Figure 23
"Alarm Indications" menu

To change the alarm indication settings, mark the related entry by moving the frame (“DOWN”). Unlock the entry to make the amendments (“SELECT”). Modify the actual setting by “+” or “-“ and save the final setting (“ACCEPT”).

In course of changes the step size which is effected by “+” or “-“ increases gradually. It might be necessary to reset the step size to 0.1 by changing the direction from “+” to “-“ or from “-“ to “+”, respectively.

With the optional earphones (note: this accessory requires hardware changes and will not work without an upgrade by the factory), the sound setting allows three values:

OFF:	no sound in any case
INT:	the general loud speaker will give alarm
EXT:	external connected earphones used for speakers

Please check Figure 24 for how to connect the external headphones. To control the volume of the external speakers, the wheel on the earphone adaptor box can be used.

The original adaptor box must be used to allow the connection of external earphones, whereas the earphone itself may be exchanged by any commonly available headphone with mini phone jack (mono).

Figure 24
Connection of earphones to the identiFINDER

Dose Alarm Lv

For the cumulative gamma dose an alarm as well as a warning level can be defined by the operator. For doing this the operator has to mark the entry which should be changed by moving the frame ("SKIP") and afterwards by unlocking the entry for amendments ("SELECT"). The actual setting can be modified by using the "+" or "-" keys. The final setting will be accepted by pressing the "ACCEPT" button. Possible settings are:

dose warning:	0.001 µSv	1 Sv
	or 1 nrem	100 rem

dose alarm: 0.001 µSv ..... 1 Sv
or 1 nrem ... .. 100 rem

Values of more than the maximum limits are clipped automatically. Depending on the special application, a warning level may not be available.

Doserate Alarm Lv

For the gamma dose rate an alarm as well as a warning level can be defined by the operator. For doing this the operator has to mark the entry which should be changed by moving the frame ("SKIP") and afterwards by unlocking the entry for amendments ("SELECT"). The actual setting can be modified by using the "+" or "-" keys. The final setting will be accepted by pressing the "ACCEPT" button. Possible settings are:

dose rate warning:	0.001 µSv/h	1 Sv/h
	or 1nrem/h	100 rem/h
dose rate alarm:	0.001 µSv/h	1 Sv/h
	or 1 nrem/h	100 rem/h

Values of more than the maximum limits are automatically clipped. Depending on the special application, a warning level may not be available.

Neutron Alarm Lv

For the neutron rate an alarm level can be defined by the operator. Unlock the entry N cpm for amendments ("SELECT"). The actual setting can be modified by using the "+" or "-" keys . The final setting will be accepted by pressing the "ACCEPT" button. Possible settings are:

neutron alarm level: 0 cpm ... .. 500 cpm

Values of more than the maximum limits are automatically clipped.

The neutron alarm level can be set in counts per minute (cpm) only. The display instead shows counts per second (cps). The transformation is 1 cpm = 60 cps.

7.6 Show Spectrum

The most important feature of the advanced options is the SPECTRUM mode. This mode can be entered by selecting “Show Spectrum” in the “More Options”-Menu or after the radionuclide identification from the IDENTification mode.

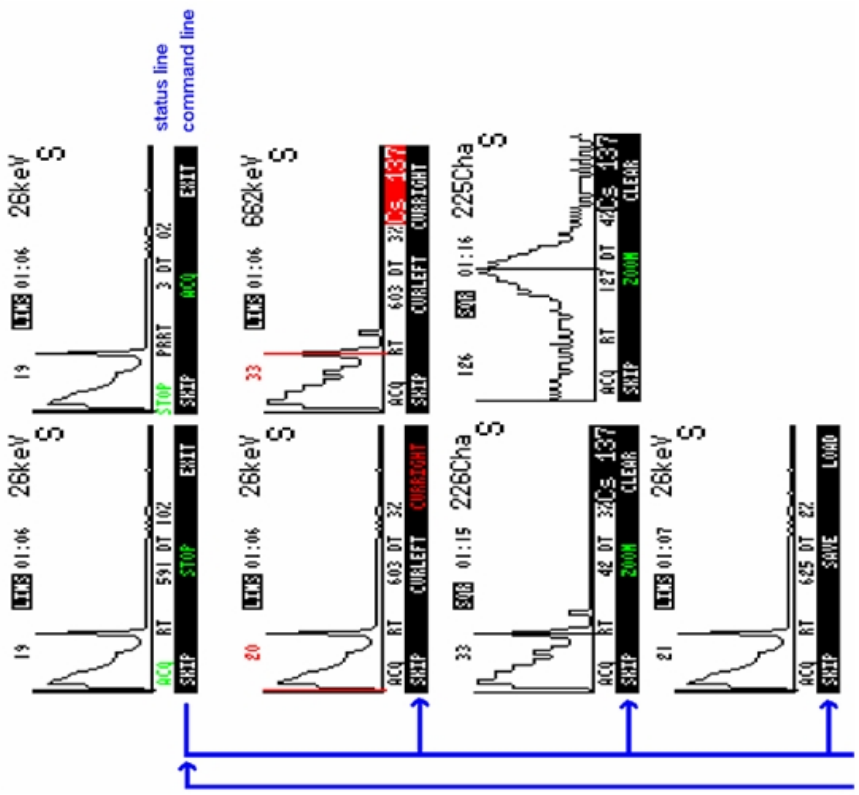

Figure 25
Command line structure in the SPECTRUM mode (1)

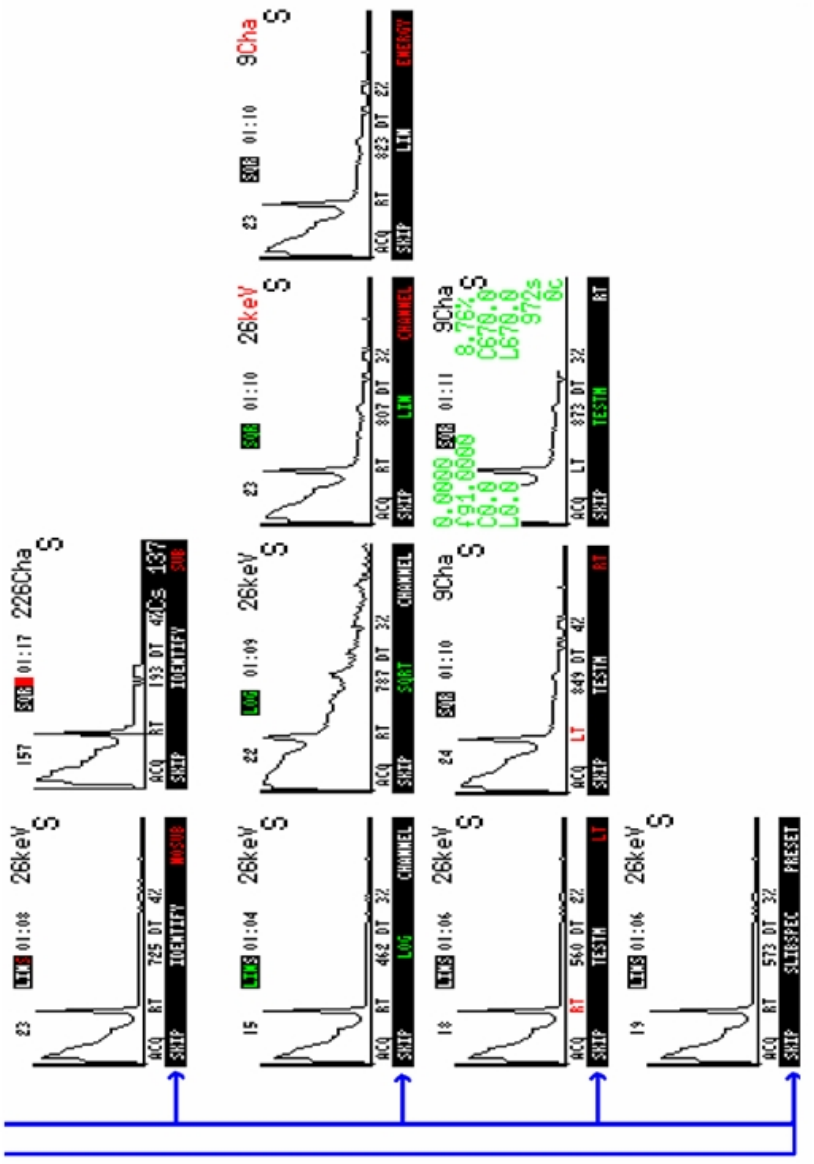

Figure 26
Command line structure in the SPECTRUM mode (2)

The main part of the display shows the spectrum histogram. It is updated during data acquisition. There are five entries on top, representing (from right to left) the actual cursor position in keV or channels - depending on the users choice (e.g. “662 keV” or “221Cha”), the time, the spectrum y axis (“LIN”, “LOG” and “SQR”), “ ” and “ “, respectively for subtraction or no subtraction of the optional background spectrum and the number of counts at the cursor position.

The second line on the right hand side shows the letters “S” or “N” respectively. “S” stands for a working stabilization, “N” indicates that the stabilization is currently being switched off (because of missing calibration source or high radiation level) or the initial calibration was not carried out successfully.

The status line below indicates whether the identiFINDER takes data (“ACQ”) or not (“STOP”) and shows the timing information like real time (“RT”) or live time (“LT”), the remaining real or live time after a preset (“PRRT” or “PRLT”). These times are shown in seconds; the dead time (“DT”) in per cent.

Possible commands in the SPECTRUM mode are:

ACQ

Starts a new or resumes the previous measurement. Both, display and memory will not be cleared. The status line entry will display the current state (“ACQ”) whereas the command line entry will change from “ACQ” to “STOP”.

STOP

This command stops the data acquisition. The status line entry will change to show the actual state (“STOP”) whereas the command line entry will change from “STOP” to “ACQ”.

CURLEFT / CURRIGHT

The cursor will move left or right, respectively. The actual position will be displayed in channels or in units of keV. A vanishing cursor on the left (right) edge of the display will appear on the right (left) edge again. If the cursor meets a predefined position, the identiFINDER will suggest some isotopes (^{131}I, ^{57}Co, ^{133}Ba, ^{58}Co, ^{137}Cs, ^{60}Co and ^{40}K) in the right hand corner of the status line.

ZOOM

For a more detailed look at a spectrum "ZOOM" expands the portion of the display around the actual cursor position, first. To decompress the spectrum to the complete range, press "ZOOM" again.

CLEAR

This command deletes the actual spectrum after asking again "Clear current spectrum?"

SAVE

The actual spectrum will be stored according to running numbers.

In maximum 100 spectra can be stored (0, 1, 2, …, 99). If you try to store an additional spectrum, the instrument will display the following message "No empt. Slot found Do you want to overwr. old spec.?" Accepting this by pressing "OVERWRITE" will open an entry field and by using the "SKIP" command the operator can select the spectrum that will be overwritten.

LOAD

This command returns the selected spectrum to the display. The shown history helps to make a proper selection which is made by "SKIP" and needs to be confirmed by "LOAD" afterwards.

IDENTIFY

The identiFINDER will start the identification algorithm using the spectrum currently displayed.

SUB

This command is thought to remove a background from the spectrum by subtracting a background spectrum (i.e the spectrum of the internal Cs137 source) that can be measured and stored by the factory or a trained expert. On reception of the device this unique background spectrum is available, acquired in a lead chamber. The command line entry will change from "SUB" to "NOSUB" and the top line will display an additional "S" to show the current setting.

NOSUB

This command disables the background subtraction which was enabled previously by "SUB". The command line entry will change from

"NOSUB" to "SUB" and the "S" in the top line will vanish, telling the user that the background spectrum will not be subtracted.

LOG

The vertical axis will be scaled logarithmically. The command line entry will change to "SQRT". The current selection (i.e. LOG) is displayed in the top line of the spectrum window.

SQRT

The y axis will be scaled proportional to square root. The command line entry changes to "LIN". The current selection (i.e. SQR) is displayed in the top line of the spectrum window.

LIN

The vertical axis will be scaled linear. The command line entry changes to "LOG". The current selection (i.e. LIN) is displayed in the top line of the spectrum window.

CHANNEL

The actual cursor position will be displayed in "Cha" (channels). The command line entry will change from "CHANNEL" to "ENERGY".

ENERGY

The actual cursor position will be displayed in units of keV. The command line entry will change from "ENERGY" to "CHANNEL".

TESTM

Some control parameters for testing and servicing the identiFINDER will appear on the spectrum display. They are not of any importance to the user. To get rid of the excess information, just wait about ten seconds. The test mode will not vanish by pressing the middle button ("TESTM") again.

RT

The expired time is shown in the status line. It will be changed to real time ("RT") and the command line will change to live time ("LT"). The active setting is indicated in the status line. If a real time preset has been set (Chapter 7.8), "RT" is replaced by "PRRT" and the time will count down instead.

LT

Selects the expired time information to live time ("LT") and the command line will change to real time ("RT"). The active setting is indicated in the status line.

If a live time preset has been set (Chapter 7.8), "LT" is replaced by "PRLT" and the time will count down instead.

SLibSPEC

The identiFINDER allows the user to store 5 additional spectra as reference spectra which are added to the internal data base. For each reference spectrum

a number

the normal usage ("Nuc", "Med", or "Ind") and

a name (format "Xx - nnn", e.g. Cs - 137, as used in nuclide tables)

must be entered. Existing user defined references can be overwritten. User defined reference spectra are treated as elements of the internal library and hence will be used for nuclide identification algorithm (see Chapter 7.7, "Identify Options").

A user defined reference spectrum cannot be erased from the data base. It can be overwritten by a new defined reference spectrum only.

PRESET

This selection will lead the user to the preset time screen described in Chapter 7.8.

To exit the spectrum display independently of the current menu selection, it is possible to use the ON/OFF button instead.

7.7 Identify Options

Selecting "Identify Options" from the menu will open a display with two options (Figure 27):

Figure 27
Display after opening the "Identify Options"

Mark either "Identify Settings" or "Edit Isotope List" by moving the black background with the left key ("DOWN") and press "SELECT" to make changes.

Identify Settings

In the Identify Settings the following changes can be made:

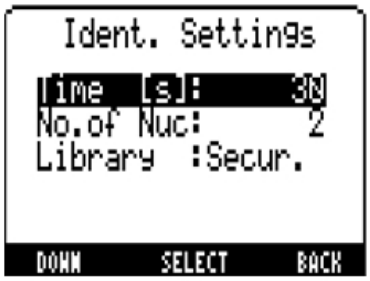

Figure 28
"Ident. Settings" menu

Time[s]

This parameter defines the duration (in seconds) of the data acquisition for the nuclide identification. Weak sources need longer measuring time.

The higher the natural background or the lower the activity of the unknown source (use the DOSE rate mode first) or the more shielded or the more mixed the source is, the larger "Time" should be chosen.

Values between 0 s and 1000 s can be chosen. A setting of 0 s will force the identiFINDER instrument to acquire the gamma ray spectrum until a total number of 3000 counts are collected. Modify the actual setting by "+" or "-" (step size: 1) and save the final setting with the middle button ("ACCEPT").

No. of Nuc

The "number of nuclides" defines the maximum number of recognized isotopes displayed after the identification algorithm. Possible settings are "1", "2", "3" or "4", respectively.

The reliability of nuclide identification increases with decreasing number of nuclides to be identified. The recommended setting for most applications is "2".

Library

The "Library" inherits the input data base for the identification algorithm. Only nuclides can be identified which belong to the selected data base. Possible settings are "Secur." (library for security applications), "Customs" (library for customs authorities), "OSI" (library for On Site Inspection), "Nuclear" (library for nuclear industry and nuclear research facilities), "Medical" (library for medical applications) and "Indust." (library for industrial applications). Depending on what library is selected, different isotopes will be available for identification.

Each of these libraries can be modified except the OSI library. The modification is carried out in the display "Edit Isotope List".

Edit Isotope List

All stored nuclide references are listed with the normal field of appearance (i.e. "OSI." for On Site Inspection, "Nuc." for nuclear isotopes, "Med." for isotopes used in therapy or diagnosis, "Ind." for industrial and "NORM" for Natural Occurring Radioactive Material) in front, the isotope name and its mass (except for special entries e.g. "Annih.Rad." for annihilation radiation spectrum) plus the libraries which inherit this isotope. By using "DOWN" or "UP" each individual entry can be marked for making changes with "SELECT". Each press of

"SELECT" toggles through all combinations of library possibilities. The abbreviations stand for:

"O" "N" "M" "I" "C" "S"

OSI Nuclear Medical Industrial Customs Security

To exit the isotope list, it is possible to use the ON/OFF button instead of scrolling up to the first nuclide available.

No entry can be added to or removed from the "OSI" library.

The default settings for the different libraries are summarized in Table 2:

Nuclide description	OSI library	Nuclear library	Medical library	Industrial library	Customs library	Security library
OSI Ba-140	X					
OSI Cd-115	X					
OSI Ce-141	X					
OSI Ce-144	X					
OSI I-132	X					
OSI La-140	X					
OSI Mo-99	X					
OSI Nb-95	X					
OSI Nd-147	X					
OSI Pr-144	X					
Nuc WG(1) Pu	X					X
OSI Ru-103	X					
OSI Sb-125	X					
OSI Te-132	X					
OSI Xe-131m	X					
Med Xe-133	X				X	X
OSI Xe-133m	X					
OSI Xe-135	X					

OSI Zr-95	X					
Med I-131	X		X		X	X
Med Tc-99m	X		X		X	X
Med Ga-67	X		X		X	X
Med I-123			X			X
Med I-125			X			X
Med In-111			X		X	X
Med Pd-103			X		X	
Med Tl-201			X		X	X
Ind Ag-110m				X		
Ind Am-241				X	X	X
Ind. Ba-133				X	X	X
Ind Bi-207				X	X	X
Ind Cd-109				X		
Ind Co-57				X	X	X
Ind. Co-58				X		
Ind Co-60				X	X	X
Ind Cs-134				X	X	X
Ind Cs-137				X	X	X
Ind Cr-51				X		
Ind Eu-152				X	X	X
Ind Eu-155				X		
Ind Fe-59				X		
Ind Ir-192				X		X
NORM K-40				X	X	X
Ind Mn-54				X	X	X
Ind Na-22				X	X	X
NORM Ra-				X	X	X

226						
Ind Se-75				X		X
NORM Th-232				X	X	X
Nuc U-238				X	X	X
Ind Zn-65				X		
Nuc Pu-239		X			X	
Nuc U-233		X			X	X
Nuc U-235		X			X	X
Ind Ac-228						
Ind. Ag-108m						
Annih. Rad.					X	X
Ind Be-7						
Ind Bi-212						
Ind. Bi-214						
Ind Ce-139						
Ind Hf-181						
Ind I-133						
Ind. I-134						
Ind I-135						
Ind Mn-56						
Ind Pb-214						
Nuc RG(2) Pu						X
Ind Sb-124						
Ind Sb-127						
Ind Tl-208						
Ind Y-88						
Ind DU(3)-238						X

Nuc Np-237					X	X
Nuc Pu-240						X
Med Lu-177			X			X

Table 2

Nuclide library, (1)-weapon grade, (2)-reactor grade, (3)-depleted uranium

NOTE:

There are a couple of exceptions on identifying nuclides in the Non-Expert-User-Mode (EASY USER MODE, i.e. a password protection has been entered into the identiFINDER, but the current user has not entered the correct password, yet; please refer to Chapter 7.11, Maintenance Menu, subsection Change Password for further information).

The following identification results will be displayed:

"Uranium" for all uranium isotopes: U-233, U-235, U-238

"Plutonium" for all plutonium isotopes: Pu-239, Pu-240

"NORM Th" for thorium and daughters: Th-232, Ac-228, Tl-208

"Am (Pluton)" for Am-241 (shielded plutonium may be present)

7.8 Presets Setup

In "Presets" (Figure 29) mark either "Real" or "Live" by moving the highlighted field ("DOWN") and press "SELECT" to make changes. "BACK" returns the identiFINDER to the prior display.

Figure 29
Possible pre-settings for time of data taking in the SPECTRUM mode

Real

Pre-sets the real time for data taking in the SPECTRUM mode (i.e. after the selected time the data acquisition will stop automatically). Values from 0 to 7,200 seconds are possible. In the SPECTRUM mode the entry in the status line changes from "RT" to "PRRT".

Live

Pre-sets the live time for data taking in the SPECTRUM mode (i.e. after the selected live time has expired the data acquisition will stop automatically). Values from 0 to 7,200 seconds are possible. In the SPECTRUM mode the entry in the status line changes from "LT" to "PRLT".

In course of changes the step size for both parameters which is effected by "+" or "-" increases gradually. It might be necessary to reset the step size to 1 by changing the direction from "+" to "-" or from "-" to "+". To disable a preset, chose the setting "none", which can be found in the sequence below "1".

If one preset parameter is different from "none" the identiFINDER stops data taking after the pre-set period. The spectrum must be stored or cleared before a new data acquisition can be started.

It is not possible to set both presets (real and live time) simultaneously.

7.9 Do Calibration

This entry provides a means for re-calibrating the device. Re-calibration is not a routine operation but may be used in order to improve the identification by re-calibrating the device. The identiFINDER performs the identical calibration procedure after starting the device.

This command starts the re-calibration of the identiFINDER instrument immediately after selecting it. Before pressing this menu item, please make sure that little external radiation is present.

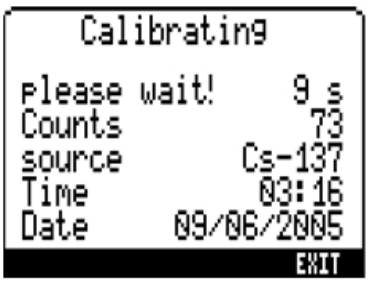

Figure 30
Re-Calibration of the device

If the calibration fails, e.g. due to unfavorable radiation background conditions or insufficient statistics of the radiation, the failure is substantiated by an error message (see

Error Message	**Error No.**	**Possible Reason**	**What to do**
real time = 0	1	Internal error	Call service
no counts	2	No detector available, Detector failure or HV failure.	Check detector by using a radioactive source and the SPECTRUM mode.
Unknown source present. Remove all sources and press AGAIN	3; 6	Radiation background too high to find the correct gamma line or wrong adjustment of noise level.	Check for presence of radiation sources. Leave the area of increased background activity. Move the calibration source (if external Cs-137 available) away from device. Check count rate in low background area.
No reference source present	4; 7	Wrong HV value (detector exchanged, device temperature out of range) or low	Try using an external Cs-137 source (if available) for calibration. Check temperature of

		activity.	the device.
Cannot adjust fine gain. Remove all sources and press AGAIN.	5; 8	Activity too low to for calibration or very strong temperature step.	Check for presence of radiation sources. Leave the area of increased background activity. Use stronger calibration source (if applicable) to increase the desired gamma activity. Check temperature of the device.
Calibration interrupted by user	9	Calibration procedure aborted by the user.	The re-calibration was aborted and can be repeated at any time.

Table 3 for troubleshooting tips) and an advice of how to proceed.

Error Message	Error No.	Possible Reason	What to do
real time = 0	1	Internal error	Call service
no counts	2	No detector available, Detector failure or HV failure.	Check detector by using a radioactive source and the SPECTRUM mode.
Unknown source present. Remove all sources and press AGAIN	3; 6	Radiation background too high to find the correct gamma line or wrong adjustment of noise level.	Check for presence of radiation sources. Leave the area of increased background activity. Move the calibration source (if external Cs-137 available) away from device. Check count rate in low background area.
No reference source present	4; 7	Wrong HV value (detector exchanged, device temperature out of range) or low activity.	Try using an external Cs-137 source (if available) for calibration. Check temperature of the device.
Cannot adjust fine gain. Remove all sources and press AGAIN.	5; 8	Activity too low to for calibration or very strong temperature step.	Check for presence of radiation sources. Leave the area of increased background activity. Use stronger calibration source (if applicable) to increase the desired gamma activity. Check temperature of

			the device.
Calibration interrupted by user	9	Calibration procedure aborted by the user.	The re-calibration was aborted and can be repeated at any time.

Table 3

Calibration Errors

In case of an unsuccessful calibration, the user is given three options: "CONTINUE" to go on acquiring data for calibration, which is the most efficient way to precede in case of low count rate errors (i.e. "No reference source present"). The "AGAIN" option should be used if the device shows "Unknown source present" or "Cannot adjust fine gain", since the calibration will start from scratch. If the "EXIT" button is used, the calibration will terminate unsuccessfully.

7.10 Setup Disp./Time

To change the settings for the display or the internal clock, mark one of the entries shown in Figure 31 by moving the highlighted field with the left key ("DOWN") and press "SELECT" to enable changes.

Figure 31
Selectable options in menu "Setup Disp./Time"

Display Settings

In the display settings menu (Figure 32) mark either "Language", "BkLight[s]", "Contrast" or "AutoOff[m]" by moving the inverted field ("DOWN") and press "SELECT" to make changes. "BACK" returns the identiFINDER to the prior display.

Figure 32
Options in the menu "Display Settings"

Language

This command is used to select the language. Possible settings are "ENG" for English, "FRA" for French, "SPA" for Spanish, "DEU" for German or "RUS" for Russian.

Make sure you will be able to operate the identiFINDER in the language you have selected. The language will change after confirming with the middle key ("ACCEPT") and leaving the screen.

BkLight[s]

Every button operation illuminates the display for the selected period. Values from 5 to 60 seconds are possible (step size 1).

Contrast

The LCD display is very sensitive to the ambient temperature. This effect is internally compensated. Extreme temperatures might require a manual readjustment. Values from 0 to 40 are possible (step size 1).

A.Off[min]

In all modes except for DOSE rate and FINDER mode, the identiFINDER will automatically switch off a selectable time after the last button operation. Values from 1 to 60 minutes or "never" are possible (step size 1). Shortly before the device switches off a tone sounds (only if the speaker has been enabled!). Within the next 5 seconds the switch off can be disabled by pressing one of the left, middle or right keys twice.

Date/Time

In this menu the internal date and time can be set.

Figure 33
Display for setting internal date and time

Each digit must be changed separately. Mark the digit by moving the black background ("SKIP") and modify by "+". "EXIT" returns the identiFINDER to the prior display.

Date

The requested format is Dd.Mm.Yy. Due to internal consistency checks, it may be necessary to change d before D (or vice versa) and m before M (or vice versa) in order to achieve an allowed setting at all times.

Time

The requested format is Hh.Mm. Due to internal consistency checks, it may be necessary to change h before H (or vice versa) in order to achieve an allowed setting at all times.

7.11 Maintenance Menu

After opening the "Maintenance" menu of the identiFINDER instrument the display shown in Figure 34 will appear:

Figure 34
"Maintenance" display

One of five different entries can be marked (move the inverted field by "DOWN") and selected ("SELECT") afterwards:

Change Password

This menu item provides for two options to set and clear the password that allows access to the *EXPERT USER MODES*.

Set Password

Figure 35
Display for setting password

The password is defined as a combination of exactly seven letters ("L", "M" and "R"). After entering the desired combination of seven letters, confirm the password with the right key ("ACCEPT") or "CHANGE" the password with the left key. To "ABORT" the password selection, use the middle button. In Figure 36 the password protection of the *EXPERT USER MODES* is summarized:

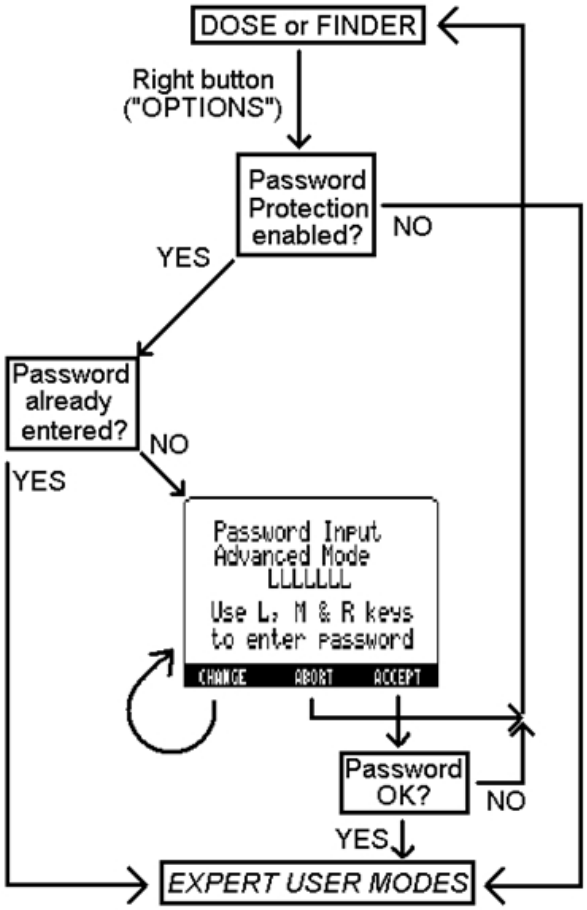

Figure 36
Password protection of the EXPERT USER MODES

When setting a password, make sure to remember it. There is no way to enter the *EXPERT USER MODES* without a valid password (once the *EXPERT USER MODES* have been exited).

Clear Password

Selecting "Clear Password" will erase the existing password without any additional notice.

Show Status

Three main status parameters are shown immediately, some more can be reached by "MEMORY". The "MEMORY" display shows the software version installed and performs a test of its SRAM memory. The device Serial number is displayed as well as the current date and time information.

The first line of the "Show Status" menu reports the software ("SW") and hardware ("HW") revision of the device.

The parameter "Battery" displays the voltage of the powerPACK or powerPACK plus, the nominal voltage of which is roughly 5V (all 4 AA Batteries fully charged). The device will switch off automatically, if the battery level drops below a specific voltage level.

The "BackupBat" entry shows the status of the internal battery supporting the memory of the identiFINDER. Possible displays are "OK" or "EMPTY" (data acquisition is still possible when "EMPTY" is displayed). This backup battery is not accessible for the customer, to replace it please contact the manufacturer.

Also the High Voltage applied to the photomultiplier tube can be read.

Factory Defaults

If this choice is confirmed once more, the device will automatically restore the factory settings and the unit will switch off automatically.

This function will erase all user defined settings. It is advisable to use this feature only in emergency cases.

Menu Level 1	2	3	4	5	6	Parameter	Default (ANSI)	Default (IAEA)
EASY MODES	DOSE RATE							
	FINDER							
	IDENT							
OPTIONS								
	More Options							
		Show Spectrum						
		Identify Options						
			Identify Settings			Time [s]	30	60
						No. of Nuc	2	2
						Library	Secur.	Secur.
			Edit Isotope List					
		Presets Setup				Real [s]	none	none
						Live [s]	none	none
		Do Calibration						

Advanced Options			
Setup Disp./Time			
Display Settings	Language	ENG	ENG
	BkLight [s]	20	20
	Contrast	40	40
	A.Off[min]	never	never
Date / Time	Date	Dd.Mm.Yy	Dd.Mm.Yy
	Time	Hh:Mm	Hh:Mm
Maintenance			
Change Password			
Set Password	Password	none	none
Clear Password			
Show Status			
Factory Defaults			
Erase all Spectra			
Factory Test			
Stabilization			
Source Stab.Status			
PSA Stab.Status			
Calibration Source	Cs-137	x	x
	K-40		
Data Logging	Timer [s]	0	0
	Status	OFF	OFF
Gamma/N Counting			
Finder Options	Time [0.1s]	5	5
	Sensit.[%]	100	100
Doserate Options	IntTime [s]	15	15
	Unit	Sv/h	Sv/h
Alarm Options			
Alarm Indications	Sound	ON	ON
	Vibrate	ON	ON
	Light	ON	ON
Dose alarm Lv	Dose alarm	0.20 Sv	0.20 Sv
	Dose warning	0.15 Sv	-
Doserate Alarm Lv	Dose rate alarm	0.10 mSv/h	0.10 mSv/h
	Dose rate warning	0.04 mSv/h	-
Neutron Alarm Lv	N cpm	10 cpm	

Table 4

Factory Defaults

Erase all Spectra

This feature will erase all stored spectra of the instrument. The user is asked "Erase all stored Spectra?" and has to reconfirm by pressing the middle key ("YES").

Factory Test

Although there is no danger using this feature, it should be used only by service engineers and/or trained users. It provides tools for testing some components of the identiFINDER instrument.

The identiFINDER will start the test routines immediately after this Menu Item has been selected.

First, the keys will be checked: The identiFINDER will ask the user to press the buttons (see Figure 37).

Figure 37
Hardware test: Keyboard-left key

If the left key signal is recognized, the test will proceed to the next point, automatically. If the key press is not recognized or the user did press a wrong button, the device will display:

Keyboard Error

Left key not ok!

Then, the user must press the middle key (similar to Figure 37).

If the middle key signal is recognized, the test will proceed to the next point, automatically. If the key press is not recognized or the user did press a wrong button, the device will display:

Keyboard Error

Middle key not ok!

Last remaining test is the right key (similar to Figure 37). If the right key signal is recognized, the test will proceed to the next point, automatically. If the key press is not recognized or the user did press a wrong button, the device will display:

Keyboard Error

Right key not ok!

Next, the functionally of the display can be verified. The device will show three different pictures on screen: the checker board, a plain black and plain white display.

The following screens will tell the operator:

Hardware test

Displaying for 2 s

Checker board

The display should switch into a black and white pixilated picture. And after two seconds, the test proceeds with the question:

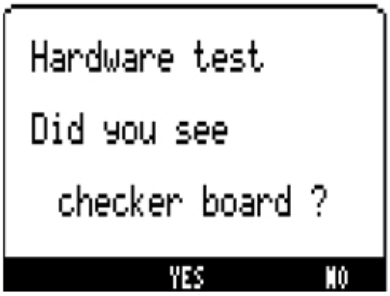

Figure 38
Hardware test: After display of the checker board

A confirmation with YES will direct the device to the next test, if the operator doesn‟ t do anything or presses the NO button, the test will proceed after a short while.

Hardware test

Displaying for 2 s

Black display

The display should turn black, completely. And again the user needs to confirm the functionality of the display (similar to Figure 38).

A confirmation with YES will direct the device to the next test, if the operator doesn‟ t do anything or presses the NO button, the test will proceed after a short while.

Hardware test
Displaying for 2 s
White display

The display should turn white.

Figure 39
Hardware test: After display of the white screen

A confirmation with YES will direct the device to the next test, if the operator doesn‟t do anything or presses the NO button, the test will proceed after a short while.

The tests for the alarm LEDs will follow:

Figure 40
Hardware test: During flashing LEDs

Please observe the red and blue LEDs during this display. They should toggle on and off (one at a time).

Here, neither the confirmation with YES nor the denial will show any influence on the test.

Last but not least the speaker will be checked. Please make sure, the correct speaker setting has been selected (MENU "Options", "Alarm", "Alarm Indications"). The test will work for both the head set and the internal speaker setting. If the sound has been switched off, the hardware test will not alarm.

Figure 41
Hardware test: During speaker performance test

7.12 Stabilization

The states of the stabilization are important for the technical staff only. They will not be described in detail.

There are different menu entries for the different stabilization processes: Source Stab. Status: Stabilization is done with an external source (on request only; use "Do Calibration", Chapter 7.9, therefore).

PSA Stab. Status: PSA is the abbreviation for Pulse Shape Analysis; this mechanism uses the width of the detected signal to determine different system variables (e.g. discrimination of noise events).

7.13 Calibration Source

This entry allows selecting a source type for the re-calibration procedure. Please note the comments and explanations made in Chapter 7.9 ("Do Calibration"). In general, this feature is disabled for identiFINDER NHG.

7.14 Data Logging

The identiFINDER is able to store dose rate and neutron count rate values together with the time information in a log file. Up to 40,000 entries can be stored, before old values are overwritten. Before starting a new log file, the memory can be cleared.

Timer

The storage time frequency can be selected; possible entries are 2 seconds up to 30 minutes. The timer must be larger than zero in order to be able to start the data logger. After the start of the new session, the user is asked whether to delete the old data.

Status

The status of the logger is either on or off.

The data logging will activated only as long as the device is switched on. As soon as the device is off, the data logger will be switched off as well. The data will still be available for read-out.

To review the dose rate and neutron rate log file, a connection to the PC is mandatory. Please refer to Chapter 10 for details.

Figure 42
Dose rate and neutron count rate logging

8 Connecting the identiFINDER to the PC

Before connecting the device to a PC, please install the delivered ICx Radiation software winTMCA32 and identiFINDER transfer according to the installation guide that can be found on the CD cover.

In any case you may only operate one program at a time. It is not possible to use both software packets simultaneously.

There are now several possibilities to connect the device to the PC, be aware that the device must be switched on before connecting it to the computer.

8.1 Serial Connection without interface box

Connect the corresponding miniUSB-to-serial cable to a COM port of the PC and the other side to the instrument.

8.2 Serial Connection with the interface box

Connect the miniUSB-to-serial cable to a COM port of the PC and the other side to the interface box. Use a miniUSB-to-miniUSB cable to connect the interface box with the device. Additionally the power supply can be (but does not necessary have to be) connected between mains socket and interface box.

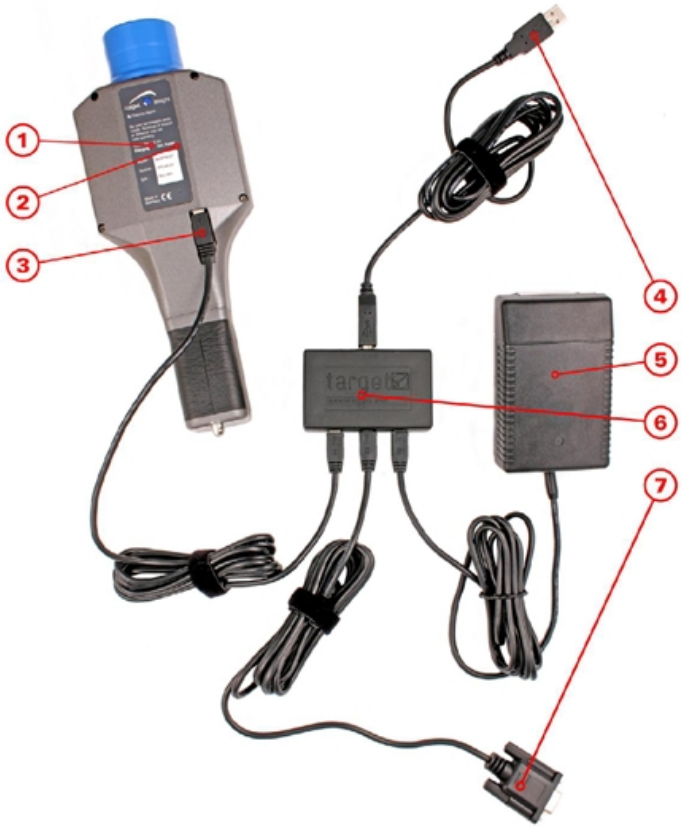

Figure 43
Charging the batteries and connection to PC with ①-orange LED (trickle charge), ②-green LED (external power), ③-mini USB connection to identiFINDER, ④-USB connection to PC, ⑤-external power supply, ⑥-interface box, ⑦-serial connection to PC

8.3 USB Connection

Use a miniUSB-to-miniUSB cable to connect the interface box with the device. Connect the USB-to-USB cable to a USB port of the PC and the other side to the interface box. Additionally the power supply can be (but does not necessary have to be) connected between mains socket and interface box.

The operating system will detect a new USB device and try to install two separate drivers. Please have the installation CD prepared when connecting the identiFINDER to the USB port of the PC for the first time.

Installing the driver for the Interface box

Connect the interface box to your PC (USB port) and insert the software CD into your CD ROM drive.

Click "Next" when you are supposed to search for driver (recommended) and choose your CD ROM drive.

Accept the driver that was found (ftdibus.inf). If necessary, browse to the directory of your CD.

Finish the first part of the installation.

Now a second INF file will be installed (ftdiport.inf). Follow the instructions on the screen accordingly.

Changing the COM port number of a USB port

From Device manager, select "view devices by type" then "Ports (COM and LPT)". Select the USB serial port and click "Properties". Select the "Port Settings" tab and then click "Advanced". Choose the required COM port number from the list and click OK.

If a modem is attached to the USB serial port when the port number is changed, it will continue to work under the new port number.

If a modem had been attached to the USB serial port but was not connected when the port number was changed, it will not work when re-attached under the new port number. In this case, the modem must be removed from the system and re-installed.

In general, if there are devices in use that have been previously attached to the USB serial port, they may not work after the port number has been changed. If this is true, remove the device from the system and re-install it.

8.4 Starting the winTMCA32 or identiFINDER Transfer Software

The software should detect the connected device automatically (the device must be running). The first pop up (Figure 44 or similar) may be ignored; it does not contain any important information. Click "NO" - it will never show up again.

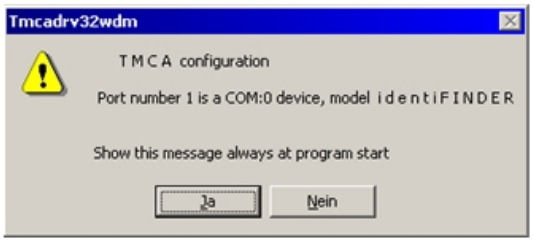

Figure 44
Pop-up when software has been started for the first time

A second pop up window (Figure 45) should appear stating an identiFINDER has been connected. Please confirm by clicking OK and the software will start.

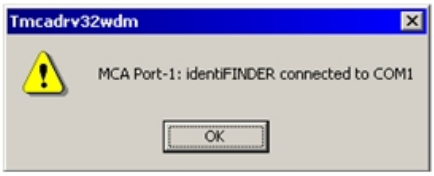

Figure 45
Message when the identiFINDER has been detected by the software

If the device is not found (i.e. the pop up does not appear) a new text file named TMCAINIT.TXT must be created in the winTMCA32 installation path subdirectory .\CONFIG containing the following line:

p=1,F,n,384

The „n“ represents the COM port number where the identiFINDER is connected to. If you use the serial COM port (RS232) n is in most cases equal to 1, whereas if you use the USB interface, n is in general larger than 2.

9 Basics of the winTMCA32 Software

This chapter will give a rough overview of the basic winTMCA32 functions, available for the identiFINDER. For a detailed guide and additional information, please refer to the winTMCA32 manual.
Switch on the device and start your winTMCA32 software.
Enter the "identiFINDER" menu. You will be given the choice of four selections (Figure 46):

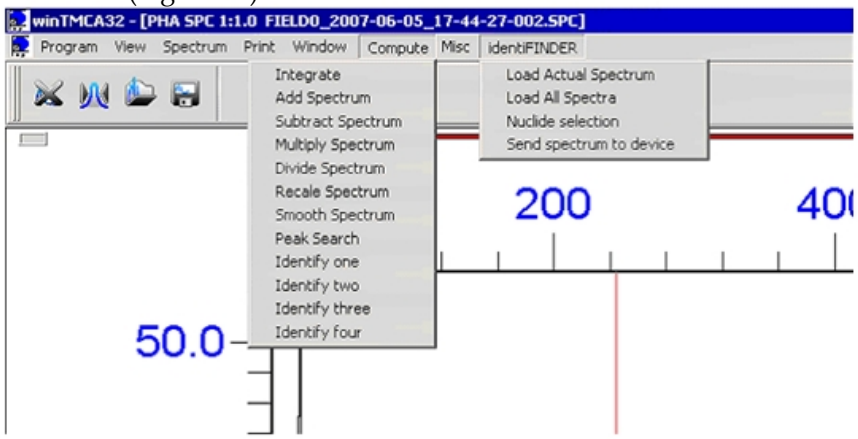

Figure 46
winTMCA32 software and important menus

9.1 Load Actual Spectrum

This menu item loads the current spectrum from the identiFINDER memory to the winTMCA32 display. The preliminary spectrum name will be aktspecf.spc. If you get an error message when downloading the spectra check all cable connections first. Please make sure that no other application is trying to access your serial or USB port.

9.2 Load All Spectra

This menu item loads all available spectra from the identiFINDER memory to the winTMCA32 display. Each spectrum will appear in the spectrum window temporarily. The last spectrum will remain at the display and all others will be stored in the spectrum folder of the winTMCA32 installation directory. The names will be composed of the identiFINDER serial number, the date and time information, when the spectrum has been stored and the storage position in the identiFINDER memory.

9.3 Nuclide Selection

The automatic identification algorithm of the winTMCA32 software has an independent library of nuclides available for identification (Figure 47). Hence they can be switched off or on with this menu.

The nuclide identification of the winTMCA32 software is done with the menu "compute" → "identify one" for one possible component in the radioactive source or "compute" → "identify two, three, four" for two, three or four possible element indications.

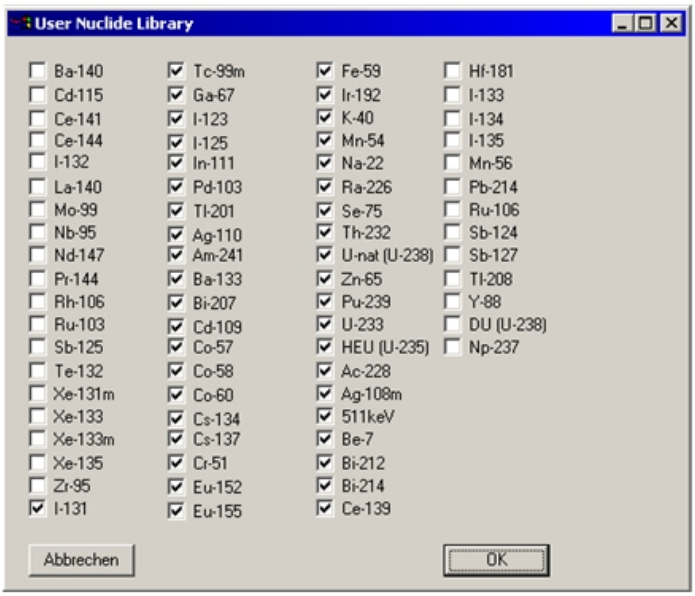

Figure 47
winTMCA32 nuclide library for identification

9.4 Send Spectrum to Device

Any spectrum can be transferred to the identiFINDER from the winTMCA32, except spectra with a length that is not equal to 1024 channels. Please be aware that the actual spectrum in the device will be erased. It will take a couple of seconds to transfer the spectrum.

9.5 Nuclide Identification

A spectrum displayed by the winTMCA32 can be analysed according to its compounds. Use the menu "compute" → "identify one" for one possible component in the radioactive source or "compute" → "identify two, three, four" for two, three or four possible elements.

A pop up window (Figure 48) will appear, giving the information on the nuclide identification.

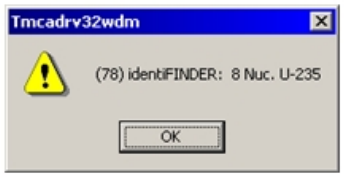

Figure 48
winTMCA32 nuclide identification results

The results of the nuclide identification may vary slightly between the results of the identiFINDER and the winTMCA32.

10 Basics of the Transfer Software

This chapter will give an overview of the identiFINDER transfer software.
Switch on the device and start the identiFINDER transfer software.
Click on the button "Preview" in order to scan for all stored spectra and log files available on the connected identiFINDER. Depending on the amount of data this transfer may take some time. The received data will be displayed in the central window below the label "Stored files".
The central part of the status bar indicates the amount of lines that have been read out of the log files (in Figure 49, 4 Lines have been stored in that file). As long as this number is counting, there are still data downloaded from the identiFINDER.
The file names of the received data are composed of the identiFINDER serial number, the storage date and time as well as the type of file:
Names of stored spectra are e.g.
"ident2650-89_2005_06_15_16-27-46-002.spc", stating the origin device" s serial number 2650-89, the date of storage 15th of June 2005 at 4:27:46PM on memory position 2.
Names of log files are e.g.
"ident2650-89_Alarm_Log_2005_06_15_16-27-46-002.txt", stating the origin device" s serial number 2650-89, the date of last entry to the alarm log file was 15th of June 2005 at 4:27:46PM.
The dose rate logger has to be switched on in order to receive any data. This can be done with the menu "Data Logging" (Chapter 7.14).
The right window shows the content of the destination directory of the PC. This directory can be altered using the button , which opens a folder select dialog.
Use the mouse to select one or more files of the stored ones. If one or more are selected you have the choice to copy them to the desired folder on the PC ( ) or send them as attachment via email ( ). Pressing the button copies all files to the specified folder.
If only one file is highlighted a rough preview is shown in the display window on the left. This is also true for one selected file in the destination folder.

Double-clicking on files that have already been transferred to the PC (hence these are displayed on the right hand side), the adequate program will open to review this file more detailed.

Alarm Log: The device stores up to 150 alarm events, the last ones will be overwritten if necessary. If the log file is not cleared, only the last 150 data records are available.

Dose Log: Up to 40500 dose rate and neutron count rate values (including time information) can be stored in the device memory. The frequency of storage can be chosen individually.

If there is no memory left, the oldest data will be erased and overwritten. Only the last 40500 values can be extracted from the identiFINDER.

Per default, this data logger is not available. To switch it on, a time interval has to be chosen which defines the speed of data logging.

The syntax of the entries is the following:

"NNNNN dd.mm.yyyy HH:MM:SS g.ggg n.nnn" with

NNNNN	position of storage (descending)
dd.mm.yyyy	date of storage
HH:MM:SS	time of storage
g.ggg	dose rate value
n.nnn	neutron count rate value (optional)

To exit the identiFINDER transfer software, use the button "Quit".

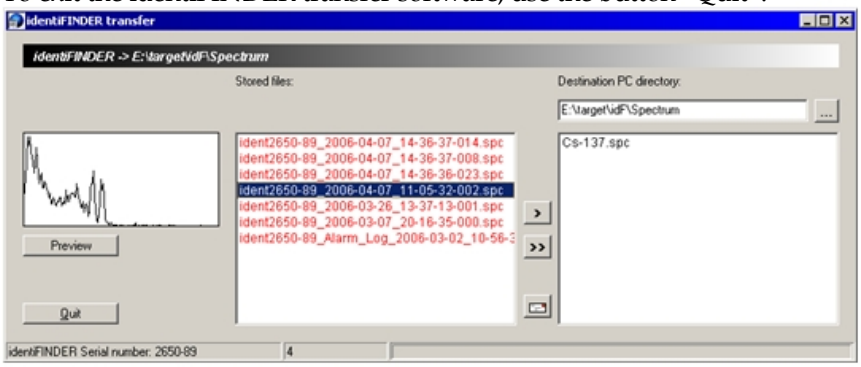

Figure 49
identiFINDER transfer software screen

11 Maintenance

11.1 Battery Indication

The actual measured voltage is shown in the battery symbol

at the upper left hand corner the display. Typical values are 5V for fully charged batteries or 6V in case the powerPACK plus is currently being charged.

In case of the message "Low Battery Warning" accompanied by an audible signal the power wil break down within a few minutes. If you are using the powerPACK plus, connect the battery charger immediately or save all data and switch off the identiFINDER to replace the powerPACK.

5.
3
5.

If the voltage drops 3elow 3.9V, the device will switch off immediately.

On the back side of the device, two LED are indicating the state of charging: The green LED on the right hand side illuminates when the external power supply is connected to the identiFINDER, the orange LED on the left hand side is switched on only while the powerPACK plus is currently being charged up in trickle charge mode.

11.2 Charging the powerPACK plus

You need the following equipment

Power supply (charger),

identiFINDER system cable,

powerPACK plus inserted into the device to charge the powerPACK plus.

Connect the power cable to the mains socket and the device directly. Observe the back sided LEDs.

An alternative is using the interface box: Connect the identiFINDER system cable to the identiFINDER interface box and charging socket

using the mini-USB cable (Figure 50). Then connect the power cable to the interface box of the identiFINDER and the power supply to your walls outlet. The green LED on the back side of the identiFINDER is indicating that the device is now operated with external power.

The powerPACK plus is charged in parallel. As long as the powerPACK plus of the identiFINDER is charged in the fast charging mode the orange charge control LED on the back side of the instrument is ON. If the powerPACK plus is fully charged the charge control logics switches to the "trickle charge" mode, and the charge control LED is OFF.

Do not open the powerPACK plus. The warranty will be void if seal is broken.

The powerPACK can NOT be used to charge any batteries, even rechargeable batteries will not be charged inside the device! This feature prevents overheating or even explosion of non-rechargeable batteries. Make sure to charge rechargeable batteries outside the identiFINDER with an external charging unit.

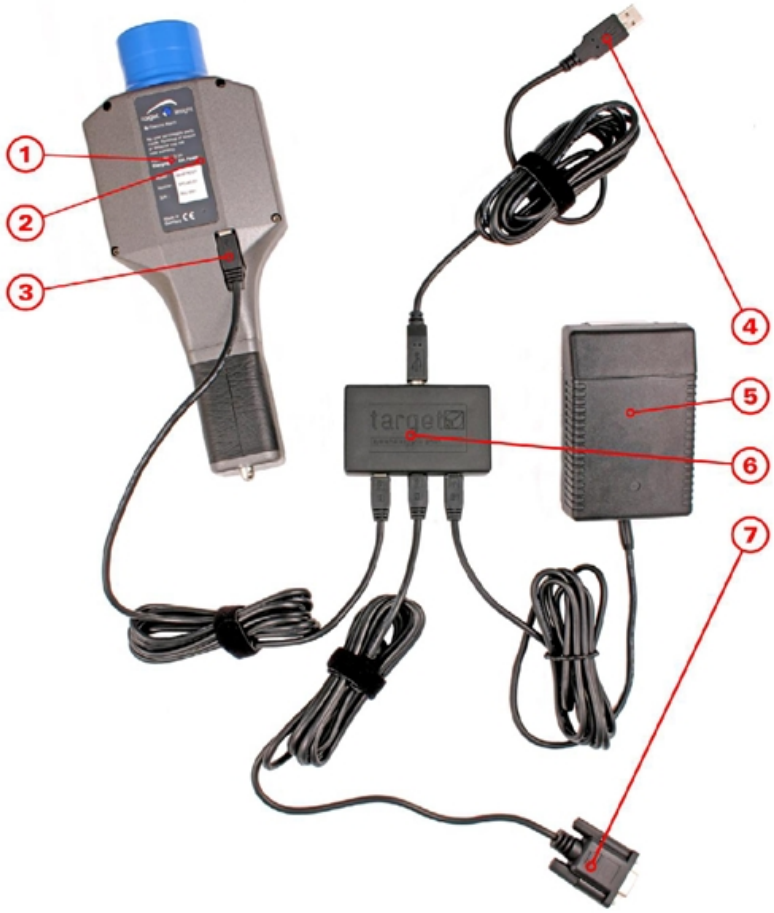

Figure 50
Charging the batteries and connection to PC with ①-orange LED (trickle charge), ②-green LED (external power), ③-mini USB connection to identiFINDER, ④-USB connection to PC, ⑤-external power supply, ⑥-interface box, ⑦-serial connection to PC

11.3 Replacing the powerPACK plus battery pack

To replace the powerPACK plus

Switch off the identiFINDER.

Turn the screw (battery pack lock) on the battery lid anti-clockwise until the lid can be removed (Figure 53), it is not necessary to unscrew the lock completely.

Shift off the handle towards the back side of the device.

Take the powerPACK plus out of the handle and replace it with a new one. Do not open the powerPACK plus. With the additional powerPACK you need 4 AA-size batteries.

When re-assembling the instrument

Make sure that the powerPACK plus is in the correct position and orientation as shown in Figure 53,

Make sure that the lid fits tight and that the housing is closed accurately and the screw fixed,

Connect the power supply in order to re-charge the powerPACK plus, check the LEDs on the back side of the device. At least the green LED should light up indicating the external power connection.

The batteries are not fully charged on reception of the Instrument. Batteries have to be inserted into the identiFINDER and the device has to be connected to power supply before operation for at least 12 hours.

Do not open the powerPACK plus. The warranty will be void if seal is broken.

Figure 51
battery pack powerPACK plus

11.4 Replacing the powerPACK or inserting standard batteries

To replace the powerPACK or insert other standard AA-size batteries

Switch off the identiFINDER.

Turn the screw (battery pack lock) on the battery lid anti-clockwise until the lid can be removed (Figure 53), it is not necessary to unscrew the lock completely.

Shift off the handle towards the back side of the device.

Take the powerPACK out of the handle.

Open the powerPACK by unscrewing the screw completely. Insert 4 (fully charged) AA-size batteries as demonstrated on Figure 52. Make sure to charge rechargeable batteries outside the powerPACK with an external charging unit. Be aware that it is not possible to charge any kind of batteries using the powerPACK.

Figure 52
Placing standard batteries into the powerPACK

Close the powerPACK and tighten the screw.

When re-assembling the instrument

Make sure that the powerPACK is in the correct position and orientation as shown in Figure 53,

Make sure that the lid fits tight and that the housing is closed accurately.

Figure 53
Replacing the powerPACK or powerPACK plus

12 Trouble Shooting

12.1 Cannot switch on the device

Check the batteries: Open the battery-box at end of the grip. Check if the powerPACK plus or powerPACK with 4 AA-size batteries is inserted and well charged.

Charge the powerPACK plus if necessary with the internal charger: Connect the device with the provided cable and power supply to a mains socket. Or insert a new set of batteries into the powerPACK.

Press ON button for a few seconds until the lights flash up.

Try again 3-4 times if necessary.

If these steps are not successful the identiFINDER must be sent back to the manufacturer.

12.2 Failing initial calibration

Switch identiFINDER OFF and wait a few seconds. Switch the identiFINDER back ON.

Wait for the result of the initial calibration.

There are a couple of reasons for a failing calibrations and ways to avoid this failure; they are summarized in Chapter 7.9.

If this problem persists, the device must be sent back to the manufacturer

12.3 Apparently wrong dose rate indication

Switch identiFINDER OFF and wait a few seconds. Switch the identiFINDER back ON.

Wait for the result of the initial calibration.

If the initial calibration is completed successfully, and the displayed value is still out of range, please contact the manufacturer.

12.4 Apparently wrong nuclide identification

Possible reasons for wrong isotope identification are:

Failed energy calibration

Failed gain stabilization

The best way to adjust the energy scale is to start with a new initial energy calibration. The calibration is easiest done by switch OFF/ON the device, or in the *EXPERT USER MODES* with "Do Calibration".

12.5 Nuclide identification not possible or 'Not in Library'

Possible reasons that the device is not able to identify the nuclide are:

The count-rate is too low: move closer to source if possible.

The calibration or stabilization has failed or is temporarily switched off. Calibrate the identiFINDER (by either switching the device OFF and back ON or using the "Do Calibration" menu in the *EXPERT USER MODES*) and wait for the "Calibration successful"-message.

The identification libraries may have been altered, check the settings in the "Identify Options" menu (Chapter 7.7).

If the count-rate is high enough, the calibration is renewed but still a „Not in Library" appeared, save the spectrum and ask an expert.

12.6 Neutron Alarm but no source present

The neutron averaging is done in a time frame of one minute. If the device had been close to a neutron source it takes one minute to show the actual count rate. The only possibility to suppress a neutron alarm duration of one minute after the detection, switch the device OFF and back ON.

12.7 No sound in case of alarm

Check the "Alarm Indications" in the "Alarm Options" menu: Is the sound switched on?

Check the alarm levels in the "Alarm Options" menu: Is the value appropriate?

If the sound is switched on and the dose/dose-rate/neutron measurement is above the adjusted alarm level but still no acoustic signal resounds, choose the "Maintenance" menu in the *EXPERT USER MODES* to check for hardware failures.

12.8 No vibration in case of alarm

Check the "Alarm Indications" in the "Alarm Options" menu: Is the vibrator switched on?

Check the alarm levels in the "Alarm Options" menu: Is the value appropriate?

If the vibrator is switched on and the dose/dose-rate/neutron measurement is above the adjusted alarm level but still no vibration signal appears, choose the "Maintenance" menu in the *EXPERT USER MODES* to check for hardware failures.

12.9 No LED indication in case of alarm

Check the "Alarm Indications" in the "Alarm Options" menu: Is the LED indication ("Light") switched on?

Check the alarm levels in the "Alarm Options" menu: Is the value appropriate?

If the light is switched on and the dose/dose-rate/neutron measurement is above the adjusted alarm level but still no LED signal flashes up, choose the "Maintenance" menu in the *EXPERT USER MODES* to check for hardware failures.

12.10 FINDER Mode does not show anything

The diagram in FINDER mode will be rescaled with every new dose rate value. Wait a few seconds until the display has changed.

You may also press DOSE to leave the FINDER mode and FINDER to enter it again.

12.11 Device switches off automatically

There are two reasons why the identiFINDER switches off automatically: The powerPACK or powerPACK plus is empty. Check the voltage and connect the external power supply to the device. Refer to Chapter 11 ("Maintenance") for details.

The function "Auto-Power-Off" has been enabled. Check the setting in the menu "Setup Disp./Time","Display Settings" (Chapter 7.10).

12.12 Password is set but unknown

The device is only usable in the *EASY USER MODES* or must be sent back to the service.

12.13 No Spectrum Transfer to PC

Check all cables and connections.

Switch the device on before starting the software, if necessary close up the software wait a few seconds and then start it again.

Check for the pop-up window (Figure 45), if it does not appear, create a text file as described in Chapter 8.4.

Make sure no other application is using the desired COM port, if necessary close up this application (also, it is not possible use the winTMCA32 and the Transfer software simultaneously).

If you are using the USB port it may be necessary to check the settings, please refer to Chapter 8.3 for details.

13 Specifications

Features	
Functions	Dose rate display, radiation guard and alarm annunciator, source finder, gamma ray spectrometer, spectrum analyzer, nuclide identifier, spectrum memory, dose rate logger, neutron indicator
Main detector	1.4 2" NaI(Tl) scintillator (other detectors available on request)
Integrated ancillary detectors	Geiger-Mueller tube (GMT) for high dose rate measurements; moderated He-3 tube (He3T) for neutron detection
Integrated electronics	Digital Multi-Channel Analyzer for main detector: Flash, ADC, Digital Signal Processor (DSP), Enhanced Filter Coprocessor (EFCOP); HV power supplies for main and ancillary detectors; Shaping Amplifiers and Discriminators for ancillary detectors (GMT, He3T); serial interface (RS232, USB)
Physical Dimensions	
Weight	1250 g including batteries and NaI(Tl) detector
Temperature range	- 15 °C to + 55 °C
Protection class	IP54 (Splash proof, dust tight)
Drop test	0.8 m on concrete
Dimensions	248 mm 94 mm 76 mm

Spectrometry System Specifications

Detector type	NaI(Tl)
HV-Bias	200 - 1275 V
Shaping	Digital filter
Resolution	7.0 % to 7.5 % at 662 keV (typical)
Throughput rate	>100,000 cps
Energy range	15 keV to 3 MeV
INL, top 99%	<0.05 %
DNL, top 99%	<0.1 %
Spectrum characteristics	spectrum length 1024 channels; linearized, calibrated, and stabilized energy scale
Spectrum memory	100 spectra at 1024 channels
Real time presets	1 s - 1,000,000 s or none
Live time presets	1 s - 1,000,000 s or none

Dose / dose rate measurement specifications

Sensitivity (^{137}Cs)	>500 cps per Sv/h
	or >5000 cps per mrem/h
Dose rate range (total)	0.01 µSv/h to 1 Sv/h
	or 1 µrem/h to 100 rem/h
Dose rate range NaI	0.01 µSv/h to 500 µSv/h
Dose rate range GM Tube	500 µSv/h to 1000 mSv/h
Dose range	0.1 µSv to 1 Sv
	or 10 µrem to 100 rem
Energy range	NaI(Tl): 30 keV to 3.0 MeV
	GM: 60 keV to 1.6 MeV
Alarm levels	Four preset levels

Special Features

Stabilization	Internal Cs-137 stabilization source
Stability	±1.0 % to ±1.5 % (typical) (-15°C to +55°C, 30 to 100,000 cps)
Calibration	Automatic energy calibration and stabilization; detector efficiency calibration
Remote Control	RS232 interface, USB adapter; setup and control including online measurements
Language	English, French, German, Russian, Spanish

Batteries and Accessories

Battery pack	powerPACK plus (rechargeable)
Standard batteries	powerPACK for 4 pieces AA-size 1.2 V - 1.8 V batteries (rechargeable NiMH, NiCd or non-rechargeable Alkaline, MnO, Li)
Operating time	More than 8 hours with 2300 mAh NiMH in DOSE rate mode
Accessories	AC adapter for stationary use and recharging powerPACK plus; RS232 and USB connecting cables and connector box; holster, carrying case Optional: earphones for alarm indication, external battery charger, neutron moderator, Potassium box, car adaptor, EOD source kit

Controls, Display, Interfaces	
Keyboard	4 soft buttons
Alarm indicators	Light (red and blue LEDs), sound, and vibration
External power indicator	LED (green) on the backside
Charger indicator	LED (orange) on the backside
Display type	Monochrome LCD with backlight, 61 mm 43 mm
Interface	RS232 and USB
Firmware	
identiFINDER SW0.2.xxx	Installed on internal flash memory; upgrade on request via serial port
Auxiliary PC Software	
winTMCA32	Transfer of spectra from identiFINDER to PC and vice versa; spectrum visualization and analysis; remote setup and control including batch procedures
identiFINDER Transfer	Transfer of multiple spectra from identiFINDER to PC; transfer of logger data files
Hardware requirements	Personal computer (IBM or compatible) with Pentium or higher processor, clock rate 500 MHz MS Windows 98, ME, 2000,or XP 20 MB free disk space XVGA graphic card USB or RS232 interface

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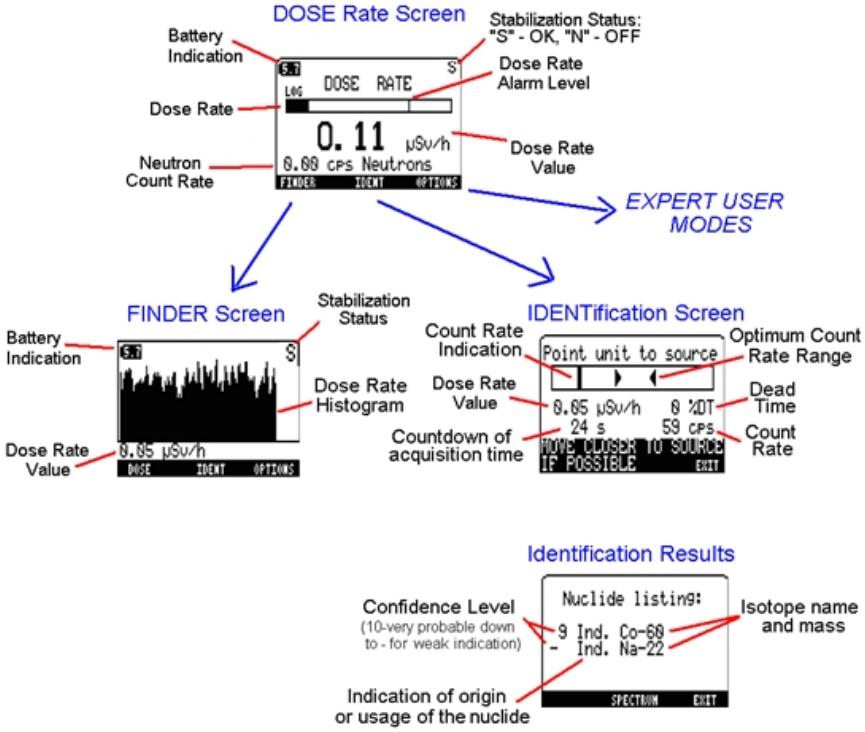
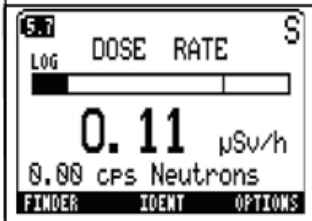
14 Quick Reference Guide

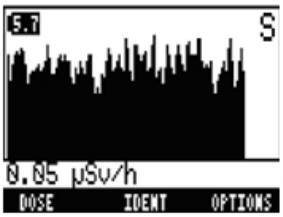
14.1 At a Glance



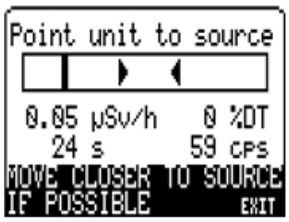
14.2 Switching ON the identiFINDER

Action	Illustration	Remark
Press the ON button → Red and blue LED flare up → Start-up screen → Initialization screen		Start-up screen
Wait until the initial Cs-137 calibration has finished → DOSE rate mode		Initialization screen. After the initial calibration is finished successfully, the instrument is ready to operate - the dose rate screen appears.
The instrument is ready to operate. Dangerous radiation levels are indicated by acoustic, visual and/or vibration alarms.		DOSE rate screen Battery voltage in Volt is shown in the upper left corner ("5.7"). The stabilization status is shown in the upper right corner: "S"-OK, "N"-not OK Dose rate is shown in big letters and indicated by the (logarithmic) dose rate bar. Neutron count rate is shown All alarms are active

14.3 Searching for a Radiation Source

Action	Illustration	Remark
From DOSE rate mode, press "L" to switch to FINDER mode to localize the source → Background measurement		Background measurement screen Count down of the time to go until the background has been determined.
Wait until background measurement is done → FINDER screen		FINDER screen The height of the bars in the screen increases the closer the device is moved towards the source. Additionally a sound with increased pitch will lead to the source if the radiation is above the background level. Battery voltage in Volt is shown in the upper left corner ("5.7"). The stabilization status is shown in the upper right corner: "S"-OK, "N"-not OK Local gamma dose rate is shown ("0.05 µSv/h")
Move the identiFINDER, watch the screen and listen for the acoustic signal. You will be guided to the source of the gamma radiation.		
If the source is located, you may - measure the local dose rate - identify the nuclide		Press "L" to return to the DOSE rate mode Press "M" to characterize the source by applying radionuclide identification

14.4 Source Characterization / Nuclide Identification

Action	Illustration	Remark
From DOSE rate or FINDER mode, press "M" to set the identiFINDER in IDENT mode If possible follow the recommendations "Move closer to source" (count rate too low for confident nuclide identification) or "Move away from source" (count rate too high for an optimum resolution)		IDENT measurement screen Optimum identification results will be obtained if the vertical black bar is in the range indicated by the two arrows. The data collection can be aborted by pressing the right button ("EXIT"). During the acquisition the actual dose rate (0.05 µSv/h), the actual count rate (59 cps), and the dead time (0 %) are shown together with the remaining acquisition time (24 s). If the detected radiation exceeds the alarm levels, the vibrator as well as the beeper will not be switched on. Only the LEDs will (even if the LED is switched off) indicate an alarm.
Wait for the results of the nuclide analysis → Nuclide listing To store ("SAVE") or check ("SPECTRUM") the spectrum: button „M" (depending on current access rights)		Nuclide list comprises a number characterizing the confidence of the identified nuclide(s) (3 to 10 for increasing confidence, hyphen for a weak signal), the nuclide classification (Industrial, Medical, Nuclear, NORM for Naturally Occurring Radionuclides or OSI for On Site Inspections), and the nuclide name and mass

If the source activity is too low, you may continue the data acquisition to obtain better statistics

If the source can" t be identified, the device shows: Not in Library!

To store or check the spectrum: button „M"

If the nuclide identification is finished, press right ("EXIT") or middle ("SPECTRUM" or "SAVE") key to switch back to the FINDER or DOSE rate mode or to store/view the spectrum.

Europe, Asia, Africa, Oceania
ICx Technologies GmbH
Piepersberg 12
42653 Solingen
Germany

T + 49.212.222090
v + 49.212.201045
k support.radiation@icxt.com
m radiation.icxt.com

North America, South America
ICx Radiation Inc.
100 Midland Road
Oak Ridge, TN 37830
USA

T + 1.865.220.8700
v + 1.865.220.7181
k support.radiation@icxt.com
m radiation.icxt.com

icx™ technologies

www.icxt.com